

## ABSTRACT

A method and apparatus are disclosed for an optical fiber cross-connect switch incorporating an absolute position encoder and a magnetic actuation system into its alignment system. The switch comprises two optically opposed arrays of fiber-optic switching units, each of which contains a single fiber active to send or receive an optical communication signal. The magnetic actuation system comprising four magnetically polarizable actuator branches positioned surrounding the fiber and a magnetizable disk circumferentially attached to the fiber end. Selective magnetic polarization of the actuator branches bends the fiber end. A two-dimensional Moiré type position encoder determines the absolute position of the fiber end. The encoder comprises at least one plurality of radiation sources, which emits pulses of radiation (control signals) directed toward the switching units. Each switching unit is equipped with a reticle, an optical system that focuses the control signals onto the reticle, and a single photodetector, which measures the power of the control signals transmitted through the reticle. A controller uses the measured control signals to determine the two-dimensional position of the fiber in that switching unit and to generate actuation signals, which form the input for the actuation system.